



HIV Serodiscordant Couples

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"I have failed to understand how discordance is possible and up to now I have never believed that I am HIV negative when my partner is positive. If all along I was not infected, how will I get infected now?"

It can be very difficult to explain to a patient why their HIV test is negative when their sexual partner has tested positive. Understanding the factors involved in the transmission of HIV can make it easier.

Serodiscordant couples are not uncommon

A study conducted in Eastern and Southern Africa identified serodiscordance among 49% of couples testing for HIV. We often do not realise that there is such a high prevalence of serodiscordant couples because individuals seldom come as a couple for HIV testing. It is essential to identify these couples because a large proportion of infections occur within stable relationships, either because of prior infection or infidelity.¹ These couples need education and support as it is more difficult to encourage them to adopt preventative behaviour with a regular partner than an occasional one.

Reasons for serodiscordant couples

There are multiple factors associated with HIV transmission, some of which we do not fully understand. These all work together to determine whether or not an individual becomes infected with HIV during an exposure. The factors can be divided into viral and host factors.

VIRAL FACTORS	HOST FACTORS
<ul style="list-style-type: none"> • HIV viral load • Phenotype of the virus 	<ul style="list-style-type: none"> • Frequency of intercourse • Sexual practices • Female • Male circumcision • Presence of other sexually transmitted infections • Genetic factors • Immune response

Viral factors

• HIV viral load

This is probably the single most important factor associated with the transmission of HIV. A recent study reported that for each log₁₀ increase in plasma HIV-1 RNA there is a 2.9-fold increase in the per-act risk of transmission.² The risk of transmission is very low if the viral load is < 400 copies/mL.³

It is important to note, however, that the viral load in plasma does not necessarily correlate with the viral load in genital secretions. HIV RNA has been detected in the genital tract of one-third of women with a plasma viral load < 500 copies/mL. For this reason the use of condoms is advised even if the plasma viral load is low.⁴

• Viral phenotype

HIV-1 transmits more readily than HIV-2. Certain subtypes of HIV-1 seem to transmit more easily than others.⁵ Viral fitness may also affect transmissibility. Fitness refers to the ability of the virus to adapt and reproduce in a host. Individual variants vary widely in the features that determine viral fitness and virulence.⁶

Host factors

• Frequency of sexual intercourse

The more frequently an individual is exposed to HIV, the more likely he or she is to become infected.

• Sexual practices

Receptive anal intercourse carries the highest risk of transmission (0.5% risk per exposure), followed by receptive vaginal intercourse (0.1% risk per exposure) and insertive vaginal/anal intercourse (0.05% risk per exposure).⁷

• Female

Females are at higher risk for contracting HIV due to the larger mucosal surface area exposed to virus during sexual intercourse.

• Male circumcision

Three large randomised controlled trials have shown that male circumcision reduces the risk of HIV acquisition by 38 - 66%.

• Presence of other sexually transmitted infections (STIs)

The risk of acquiring HIV is increased if there are pre-existing STIs, especially syphilis, chancroid and genital herpes. STIs cause mucosal breaks and increase tissue inflammation leading to an increase in susceptible cells in the genital tract. There is also evidence that STIs increase the shedding of HIV in the genital secretions of someone who is already infected, increasing their infectiousness to others.⁸

• Genetic factors

A number of genetic polymorphisms and mutations have been identified in humans that may provide resistance or increase susceptibility to infection. Examples of these include:

- **CCR5Δ32** – Individuals who are homozygous for this deletion (approximately 1% of Caucasians) are highly resistant to infection. Those who are heterozygous and infected with HIV tend to progress more slowly to AIDS. This is a rare mutation in African populations.
- A number of **HLA polymorphisms** have been associated with decreased susceptibility to infection.¹⁰

• Immune response

So far the protective aspects of the immune response to HIV are not clearly understood. There are both humoral and cellular factors that may be important. Some of these factors have been identified in clinical studies, but how they relate to a composite immune response against HIV is unknown. This is further confounded because no one has ever recovered from natural HIV infection.

- **Cellular immune response** – Cytotoxic anti-HIV immune responses have been detected in persistently seronegative Kenyan sex workers and others who have been exposed to HIV but remain uninfected.¹¹
- **Humoral immune response** – HIV-1 specific IgA is found in up to 82% of exposed, uninfected individuals. These antibodies have been shown to neutralise virus and inhibit movement of virus through the epithelium.¹²

Identifying serodiscordant couples

Patients should be encouraged to test for HIV as a couple. It is important to identify serodiscordant couples in order to prevent further transmission of infection. It has been shown that up to 22% of uninfected partners will become infected each year if exposure continues to occur.¹³ This is usually due to high rates of unsafe sexual practices in stable relationships, often driven by the desire to conceive children.¹

Management of serodiscordant couples

It is important to help the couple understand that it is possible for one to be infected with HIV while the other remains uninfected, despite repeated exposures. It is also important to emphasise that although the negative partner has remained uninfected until this point, infection may occur in the future if there is continued exposure.

- Introduce condom use.
- The uninfected partner should be tested for HIV on a regular basis: Three to six weeks after the last exposure then six monthly.
- The infected partner should start antiretroviral therapy as soon as possible, regardless of their CD4 count. Suppression of the viral load significantly reduces the risk of transmission to the uninfected partner.
- Antiretrovirals can be given to the negative partner as pre-exposure prophylaxis (PrEP). This requires regular monitoring for adverse effects and early HIV infection in case transmission occurs despite PrEP.
- If the couple wants to have children, discuss the options available that will allow them to conceive while minimising the risk to the uninfected partner.¹⁴ These include artificial insemination if the female is infected, and sperm washing if the male is infected. Direct them to their local fertility clinic for assistance.

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